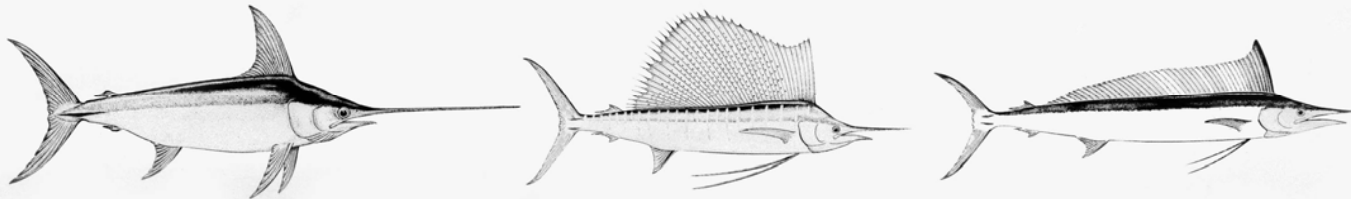
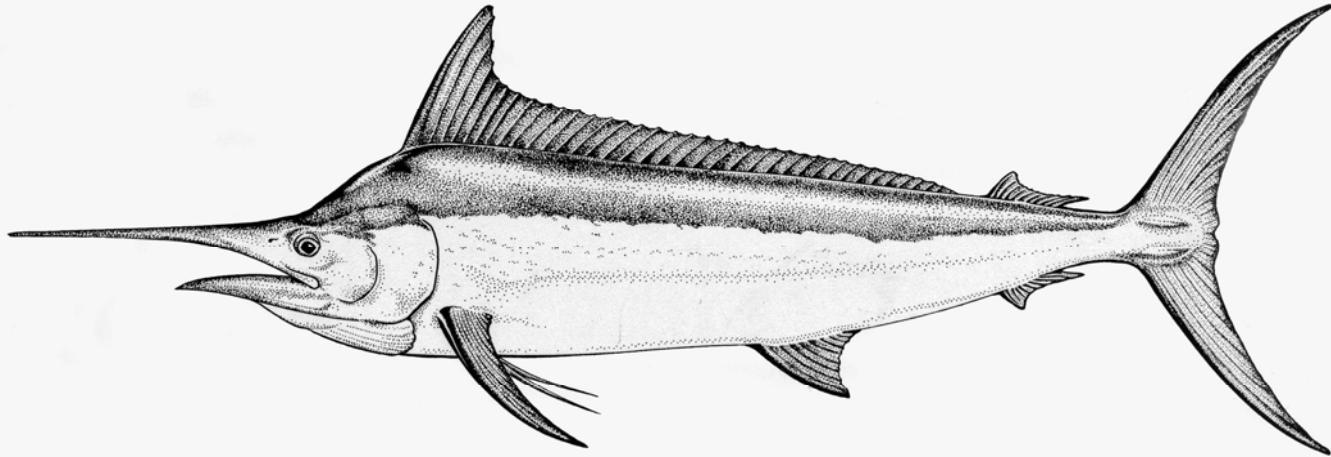
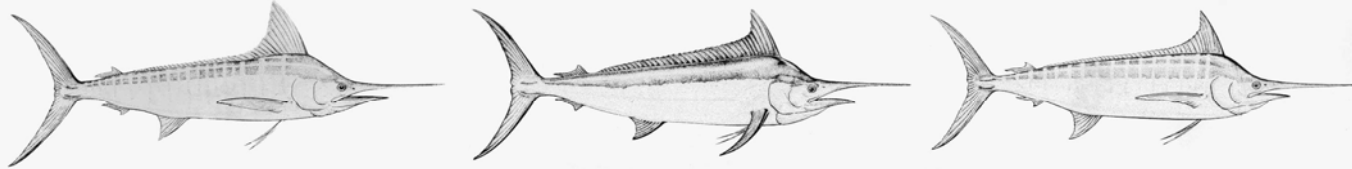
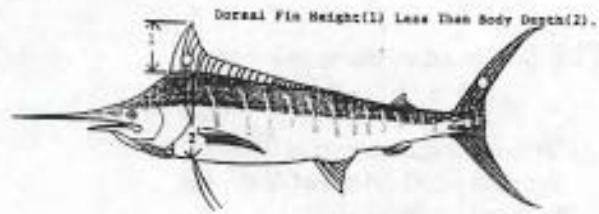


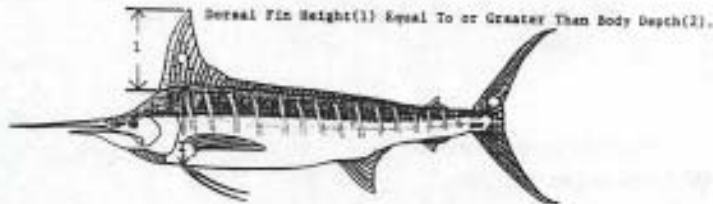
BILLFISH IDENTIFICATION



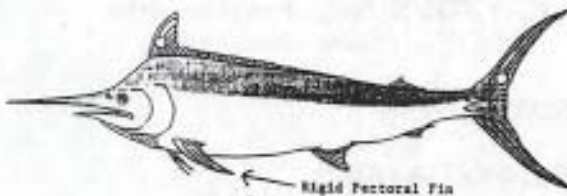
Billfish encountered in the Hawaii based pelagic longline fishery.



Blue Marlin



Striped Marlin



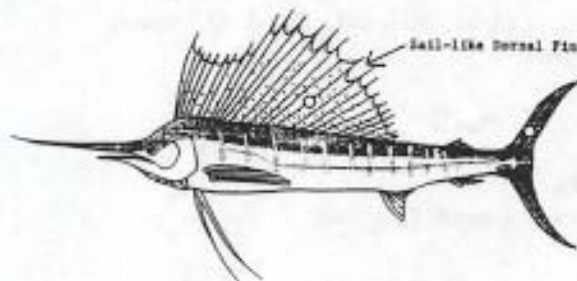
Black Marlin*



Swordfish

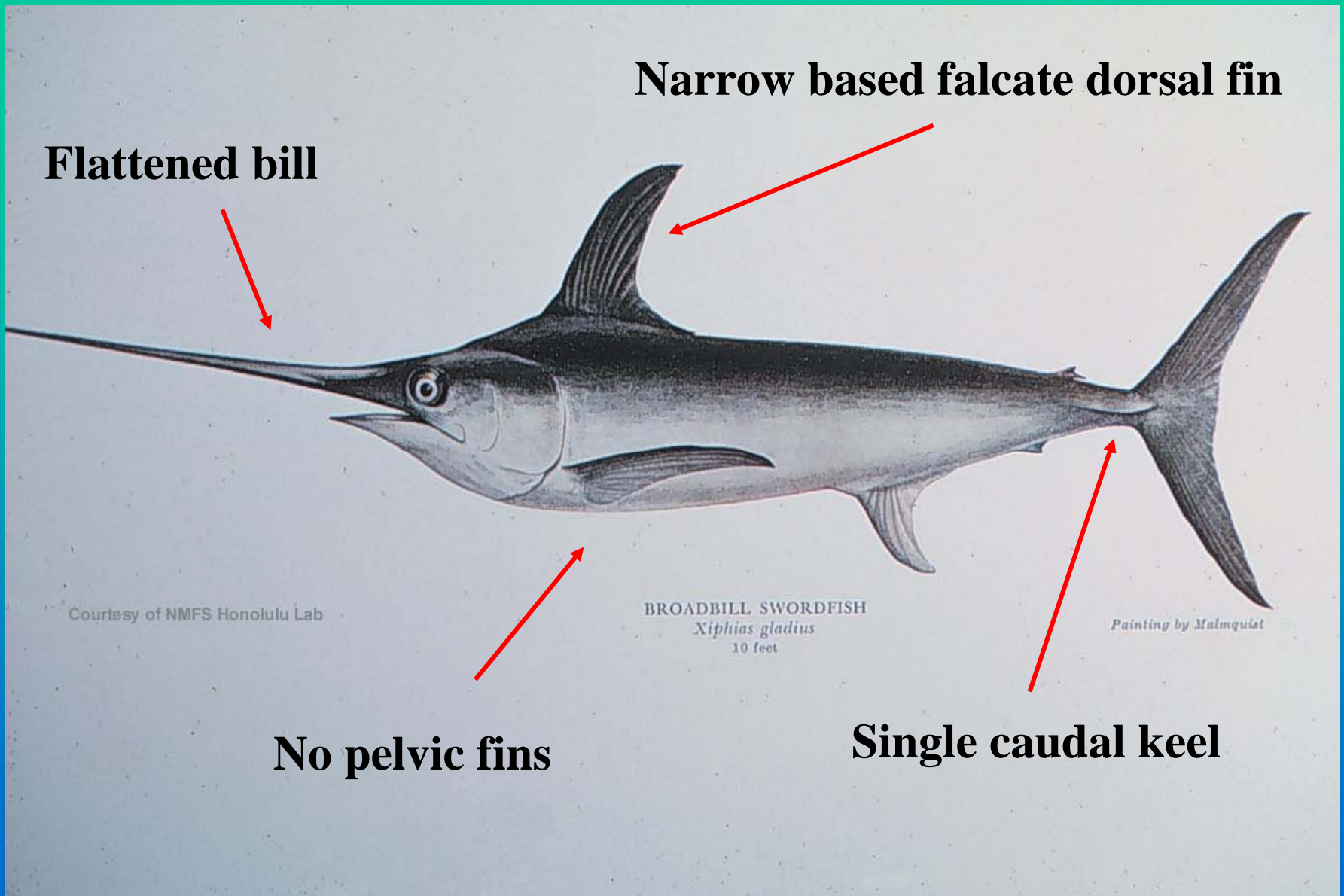


Shortbill Spearfish



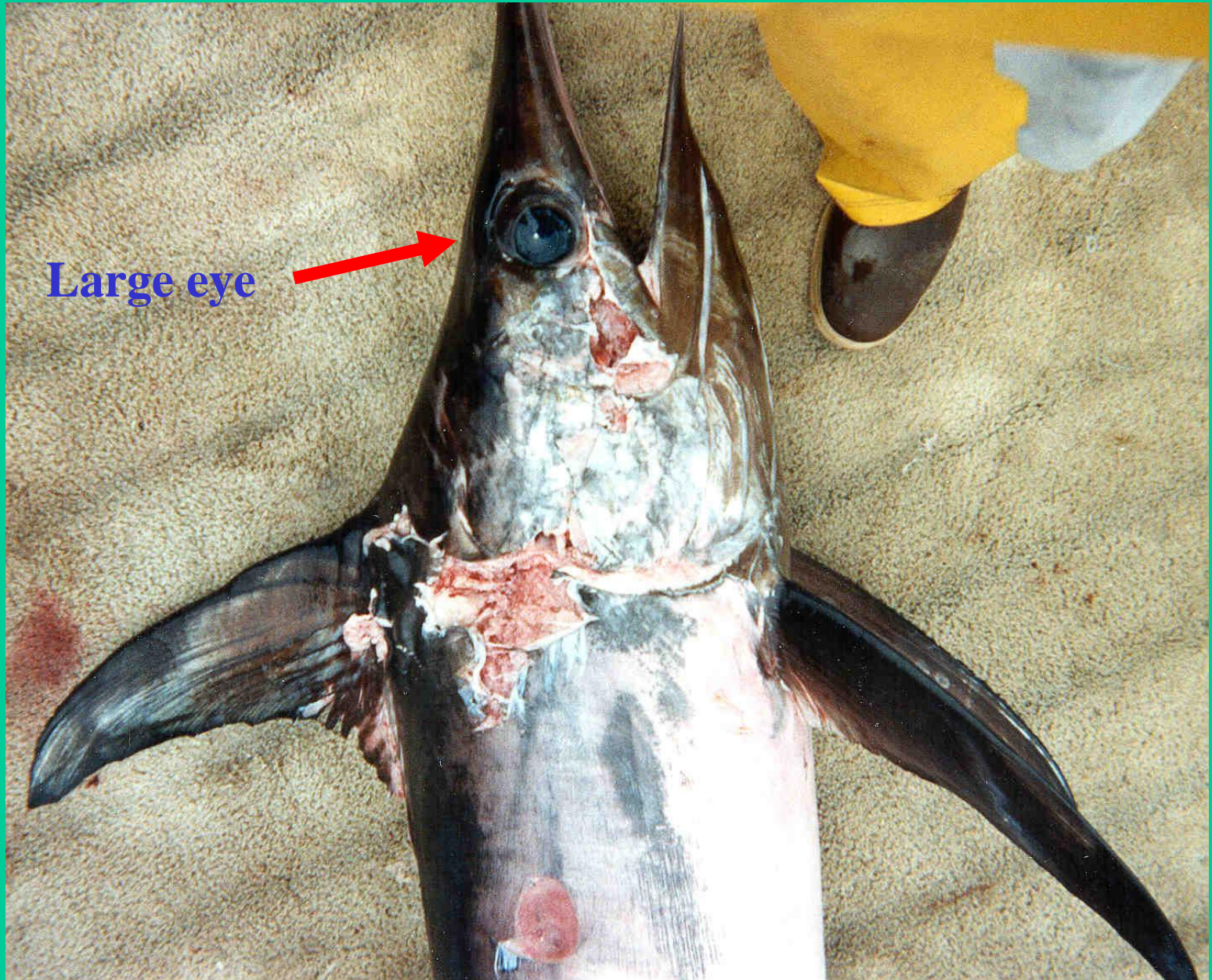
Sailfish

Broadbill Swordfish





Large eye





Swordfish being dressed for packing into fish hold.



**Note large
caudal keels**



Photo: Joe Arceneaux, NMFS/PIRO



Photo: John Buchanan, NMFS/PIRO

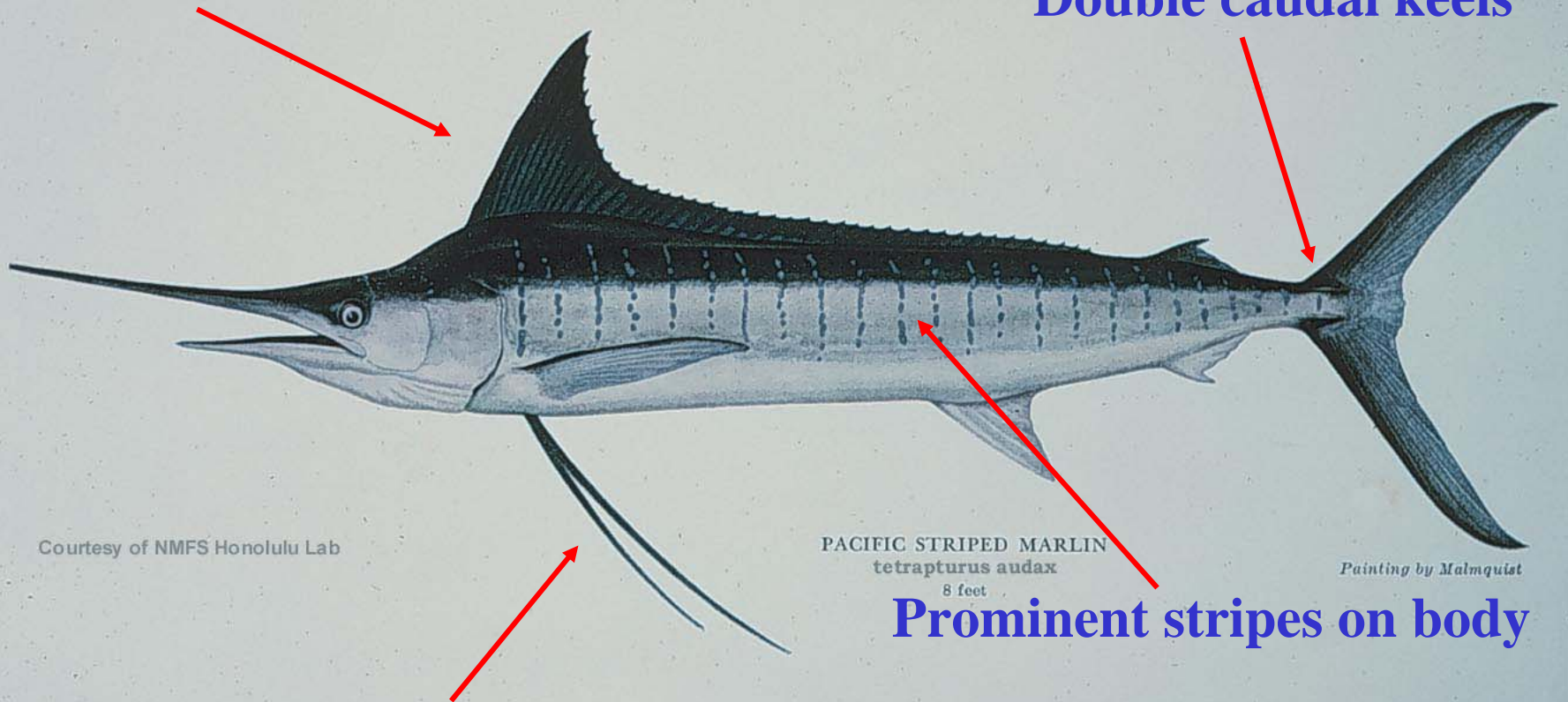
Striped Marlin

Height of dorsal fin

Double caudal keels

Prominent stripes on body

Long thin pelvic fins

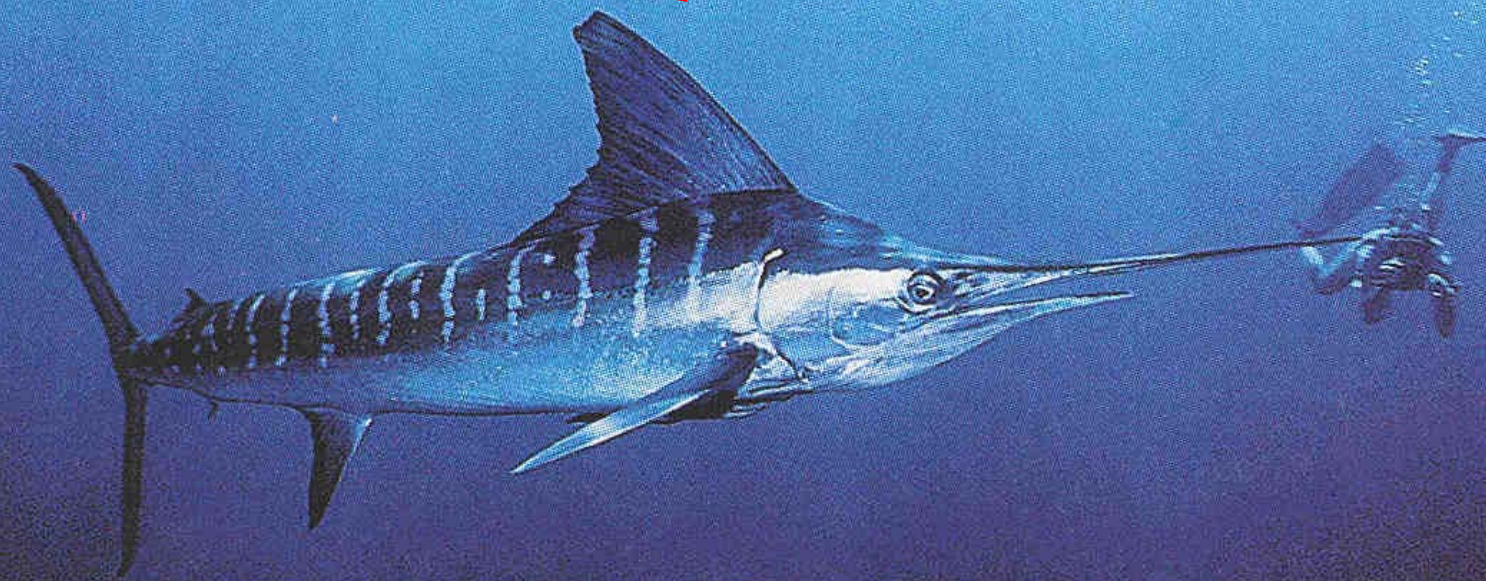


Courtesy of NMFS Honolulu Lab

PACIFIC STRIPED MARLIN
tetrapturus audax
8 feet

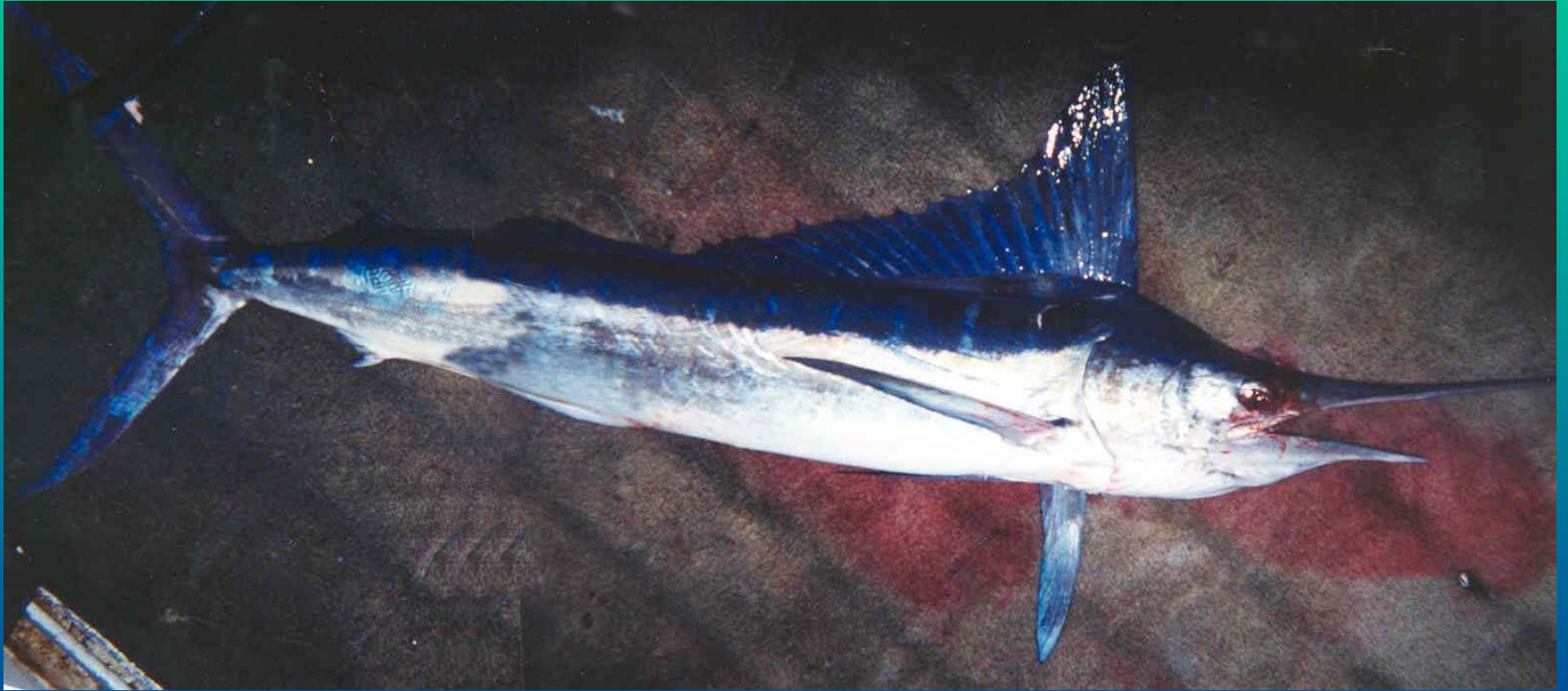
Painting by Malmquist

**Note size/shape of dorsal
fin**







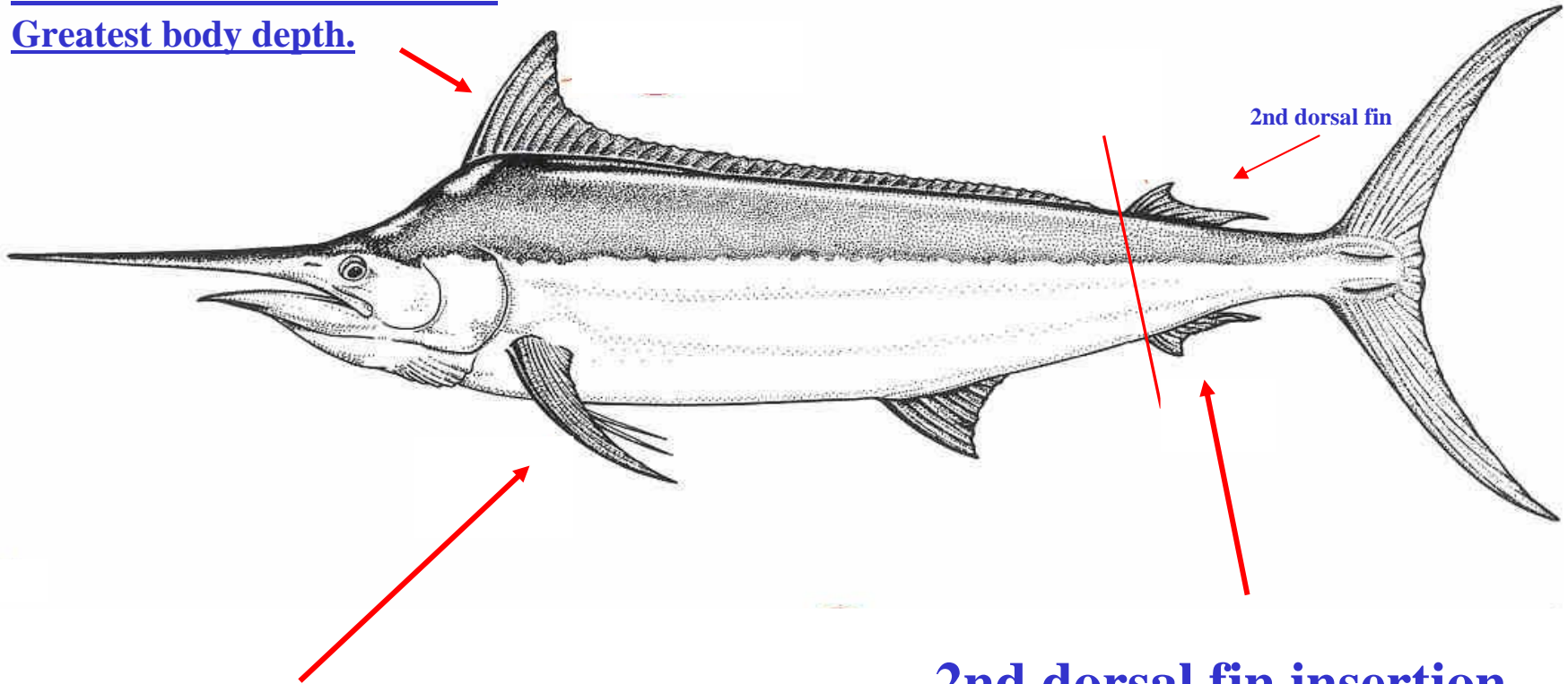


Note shape and size of dorsal fin.



Dorsal fin is 1/2 or LESS
Greatest body depth.

Drawing from book by J. Pepperel, Ph.D.



**Rigid sickle shaped
pectoral fins**

**2nd dorsal fin insertion
anterior of 2nd anal fin**

Black Marlin

Black marlins are rarely encountered in Hawaiian waters. All unsupported Black marlins ID's in the field may be considered suspect. Photographs, especially of the 2nd dorsal & 2nd anal fins or confirmation at the auction may be required to confirm ID.

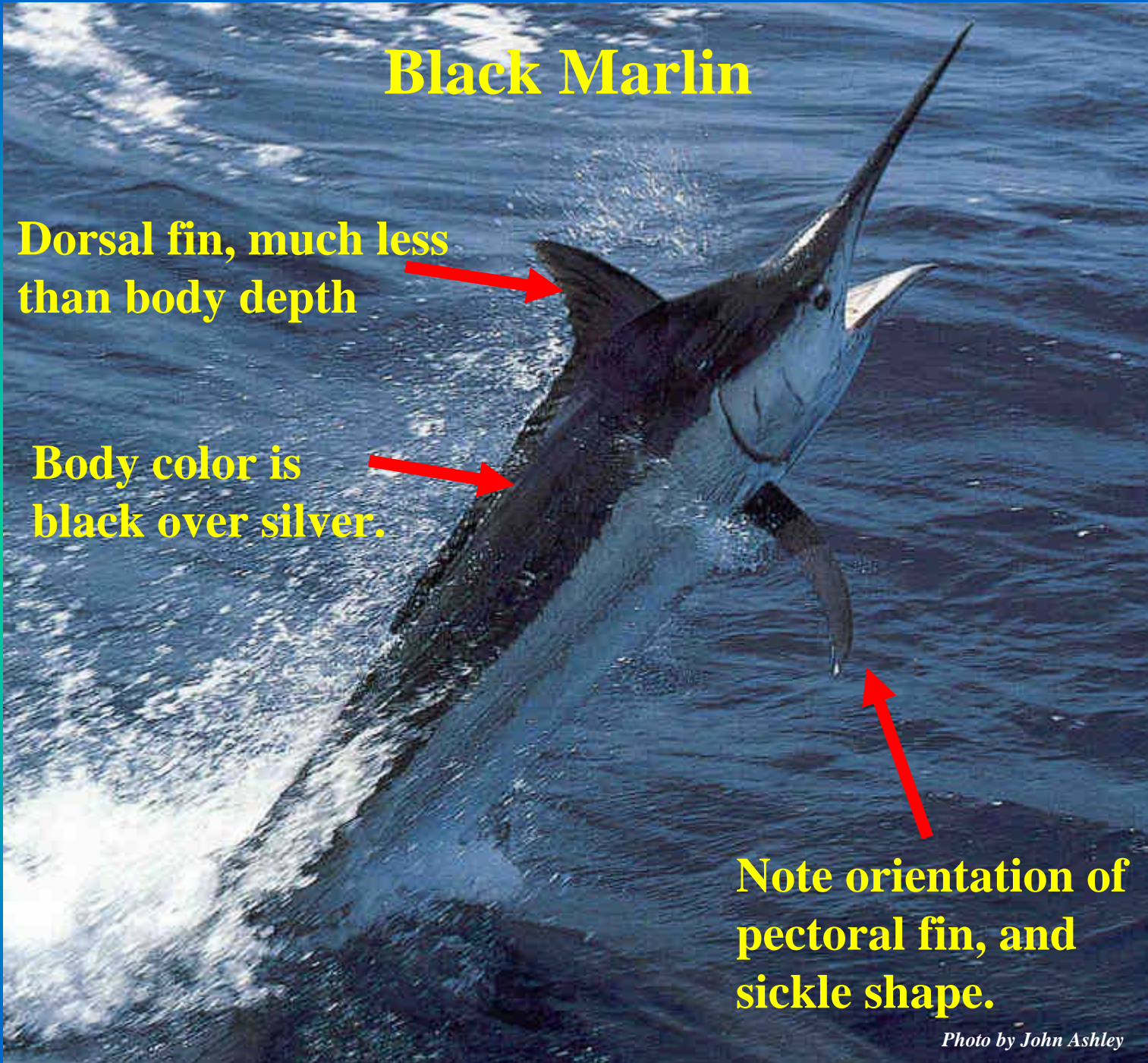
Black Marlin

Dorsal fin, much less than body depth

Body color is black over silver.

Note orientation of pectoral fin, and sickle shape.

Photo by John Ashley





Page from book by J. Pepperrel, Ph.D

Note the short dorsal fin with a rounded tip, and the distinctive pectoral fin shape.

Black Marlin



Page from book by J. Pepperel, Ph.D.



Note the shape of the pectoral fin, especially the curve of the rear edge.

Photo by D. Aab, Observer, NWO Inc.



Photo by NMFS Observer Steve Zakelj



Photo by NMFS Observer Steve Zakelj



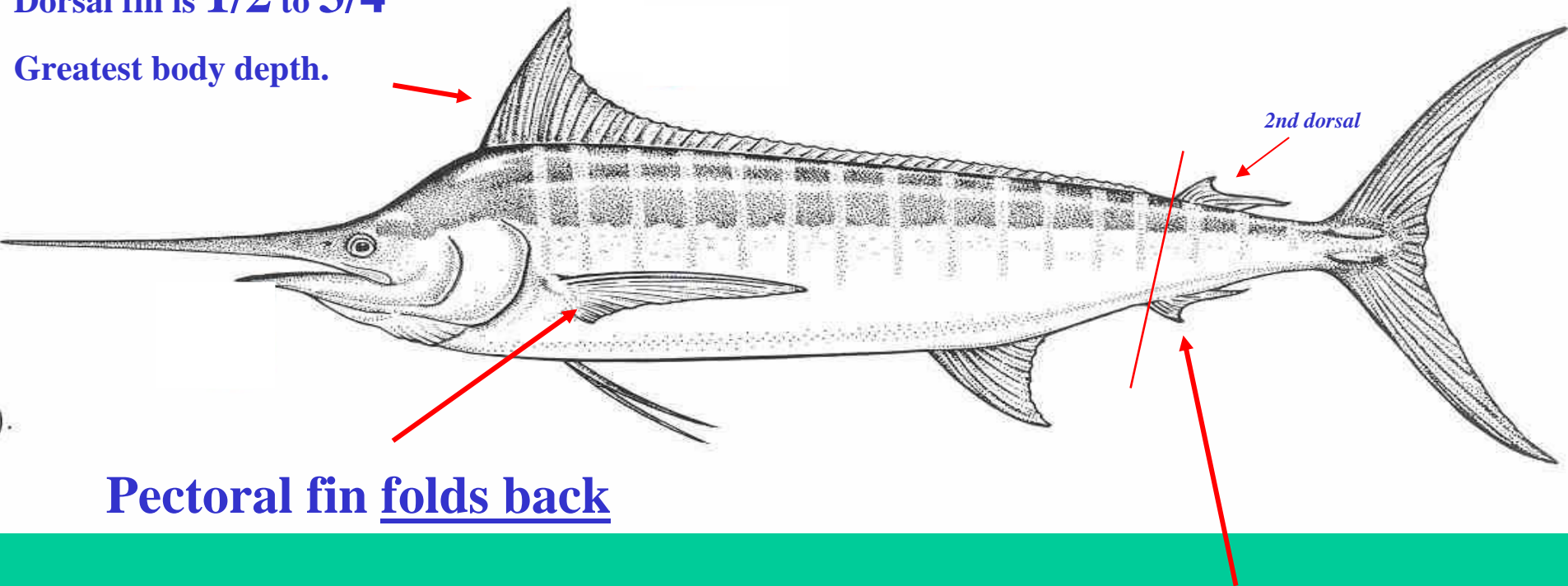
Photo by NMFS Observer Steve Zakelj

Blue Marlin

Drawing from book by J. Pepperrel, Ph.D.

Dorsal fin is $\frac{1}{2}$ to $\frac{3}{4}$

Greatest body depth.



Pectoral fin folds back

2nd dorsal fin insertion

posterior to 2nd anal fin



**Blue
Marlin**



**Note the shape & orientation of the pectoral fin,
and also the stripes on this dead fish.**





Photo by LL 1505

Note the shape of the pectoral fin and the rear edge.





Black Marlin



Black marlin showing low dorsal fin, its height about half the body depth. Also note rigid pectoral fin.

Dorsal fin height
1/2 or less than
body depth

Blue Marlin



Blue marlin showing moderately high dorsal fin, its height about two-thirds the body depth. Also note folded pectoral fin.

Dorsal fin height
1/2 to 3/4 of
body depth

Striped Marlin



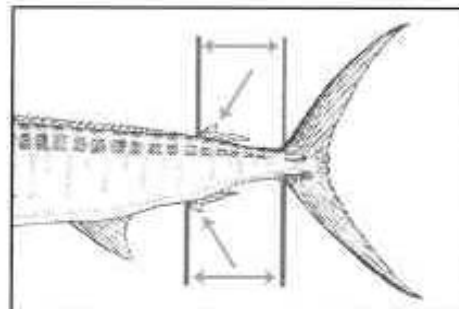
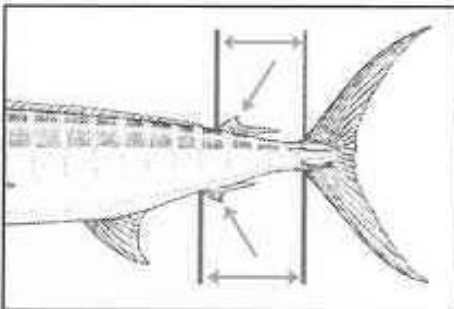
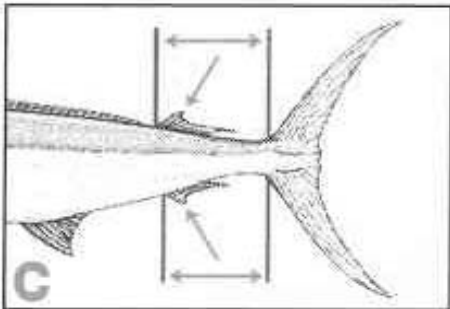
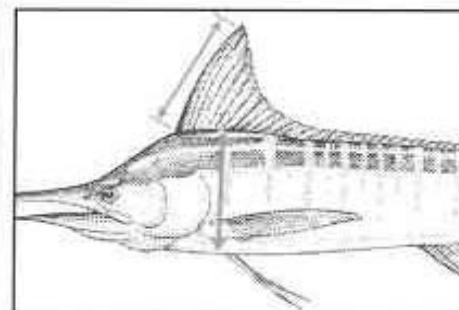
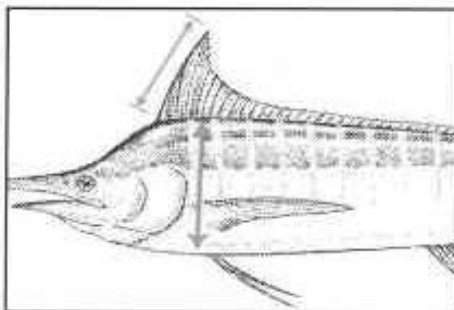
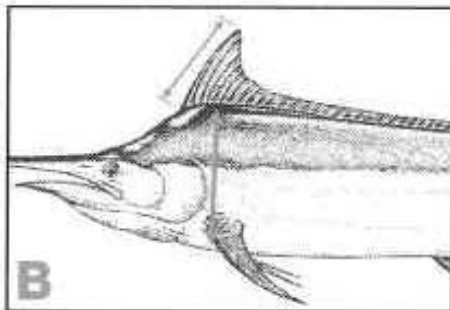
Striped marlin showing very high dorsal fin, its height about equal to the body depth. Also note folded pectoral fin.

Dorsal fin height
Equal or greater
than body depth

Black

Blue

Striped





Blue

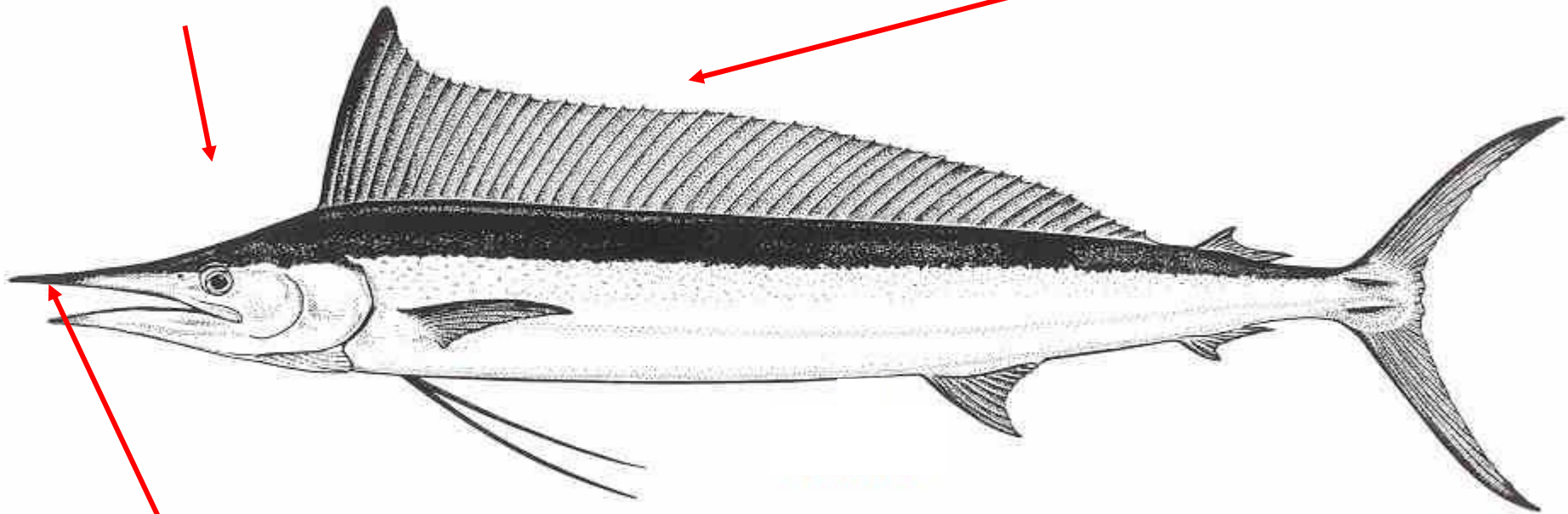
Black

Striped

Shortbill Spearfish

Low sloping profile.

Long low dorsal fin

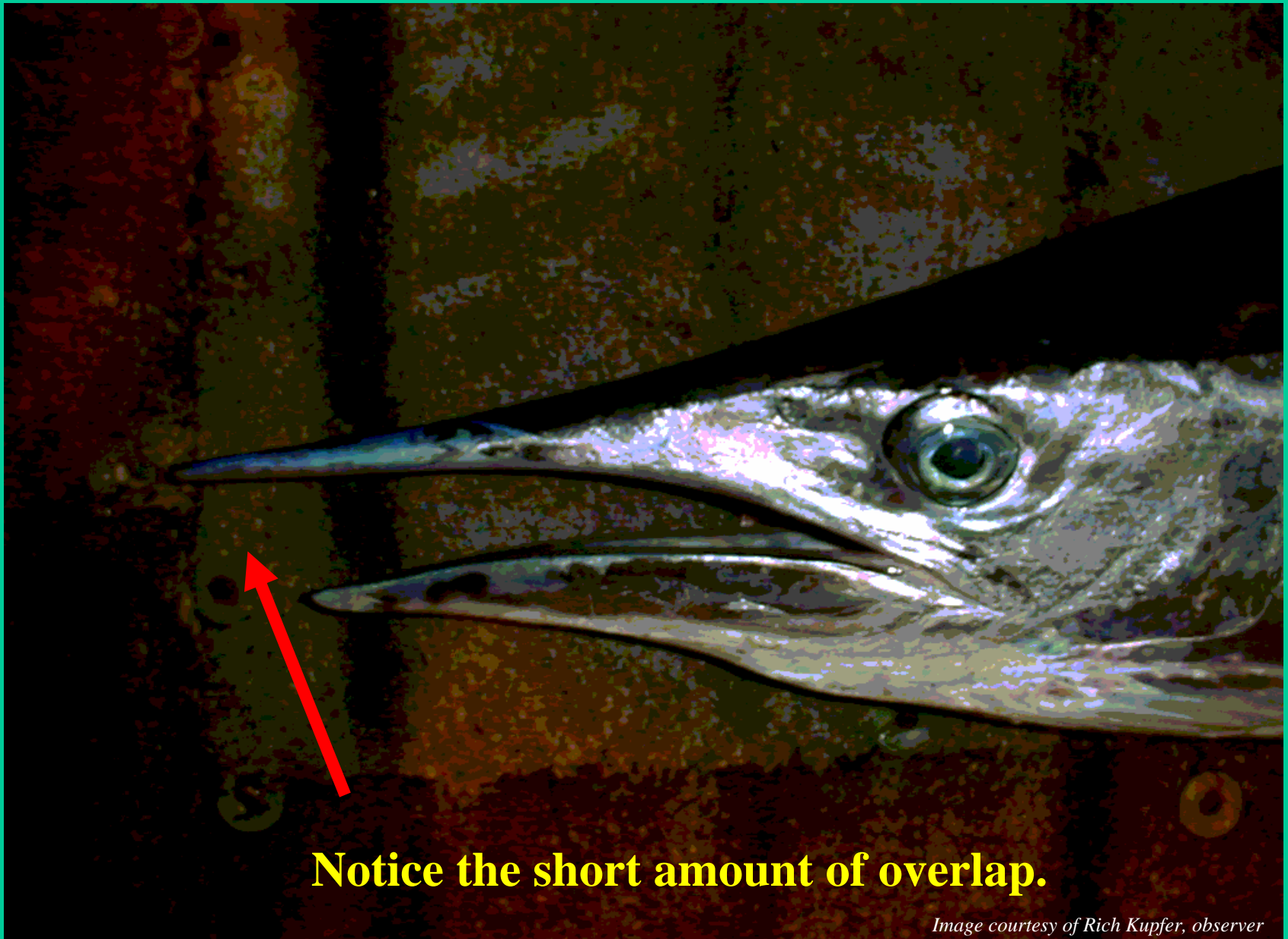


Short bill

Drawing from book by J. Pepperel, Ph.D.

Shortbill Spearfish





Notice the short amount of overlap.

Image courtesy of Rich Kupfer, observer

Comparison of bills, Stripe vs Shortbill.

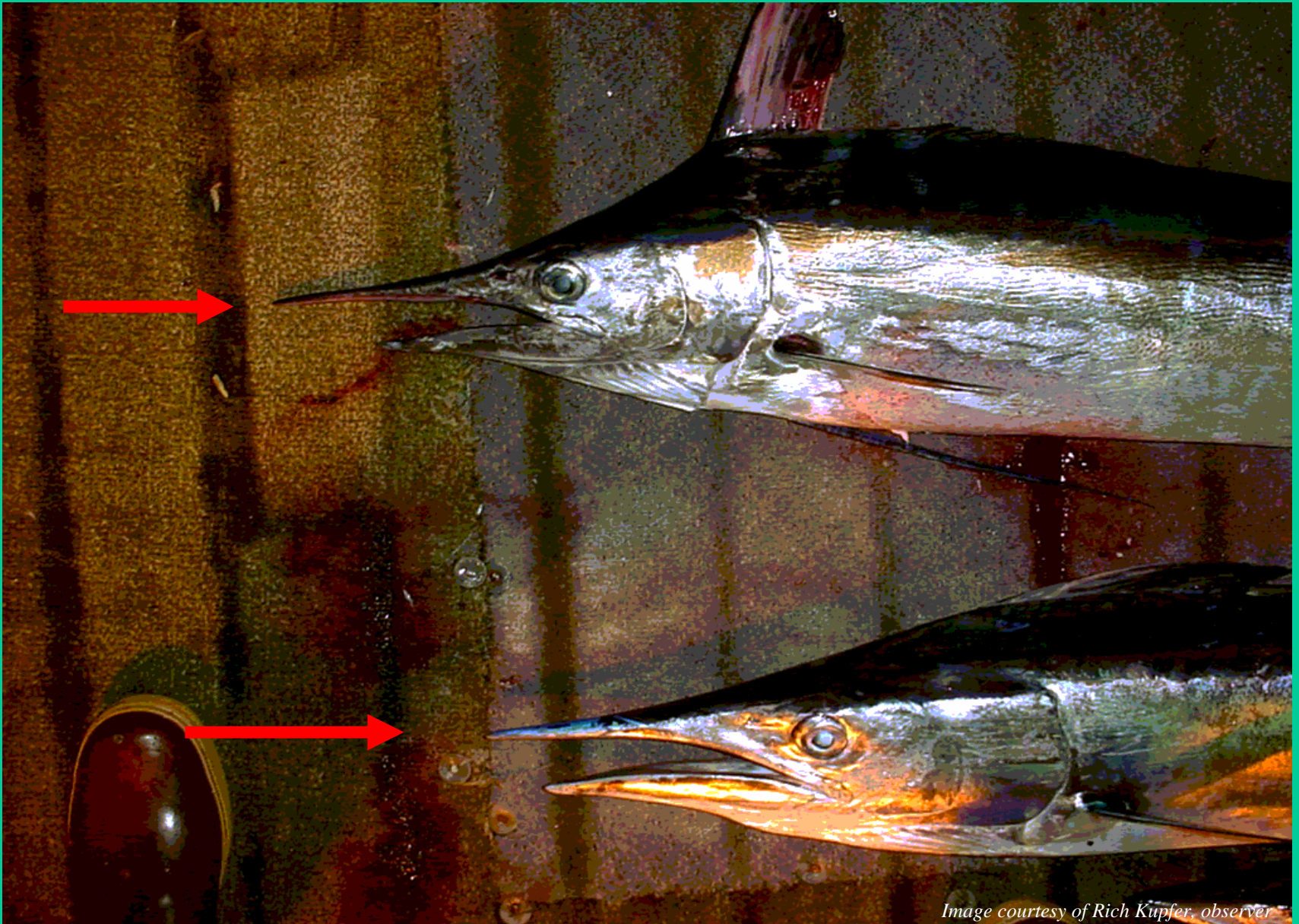


Image courtesy of Rich Kupfer, observer



Photo: Joe Arceneaux, NMFS/PIRO

Note shape and height of the dorsal fin.



Image courtesy of State of Hawaii/DBET

Sailfish

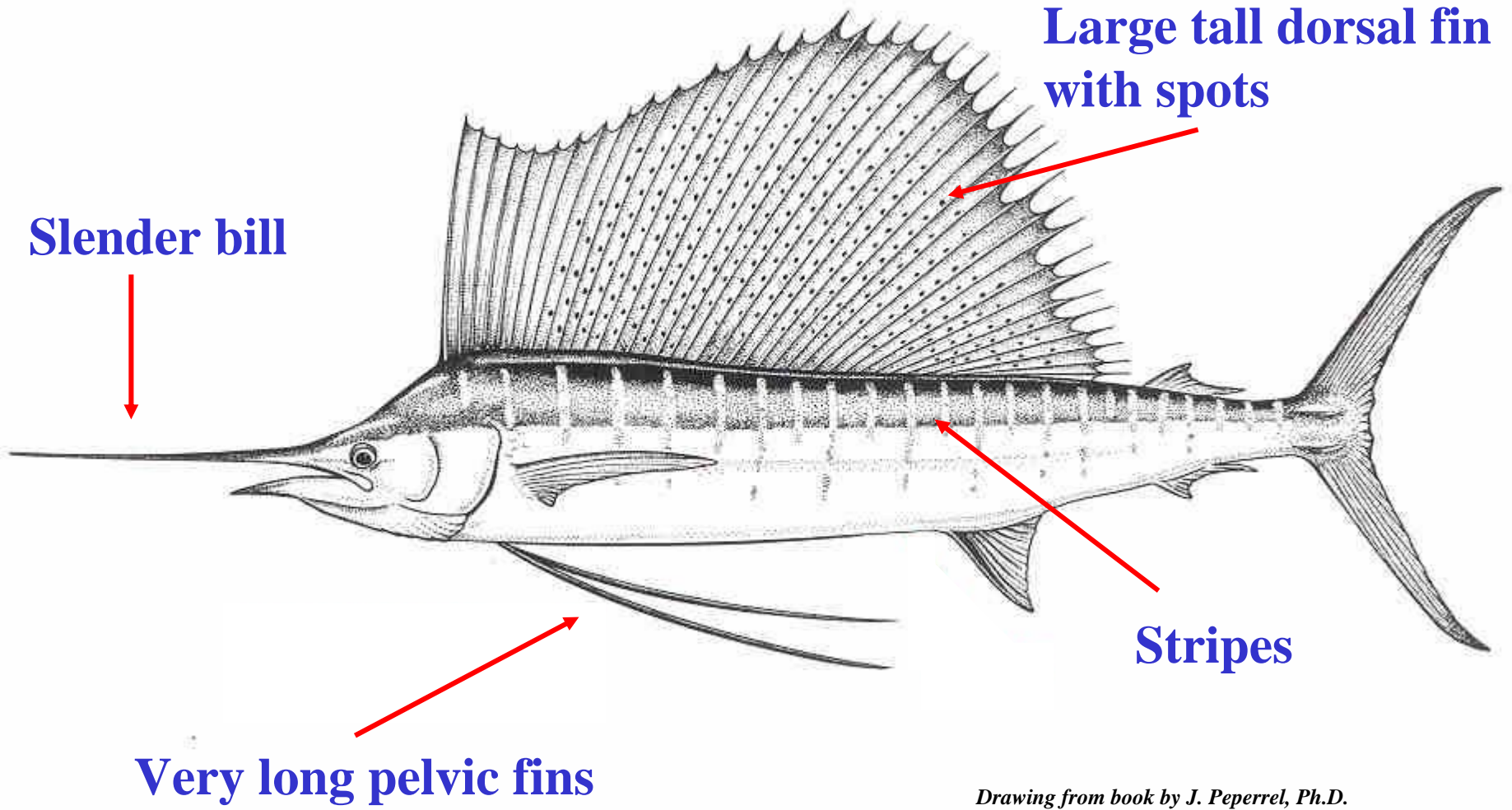






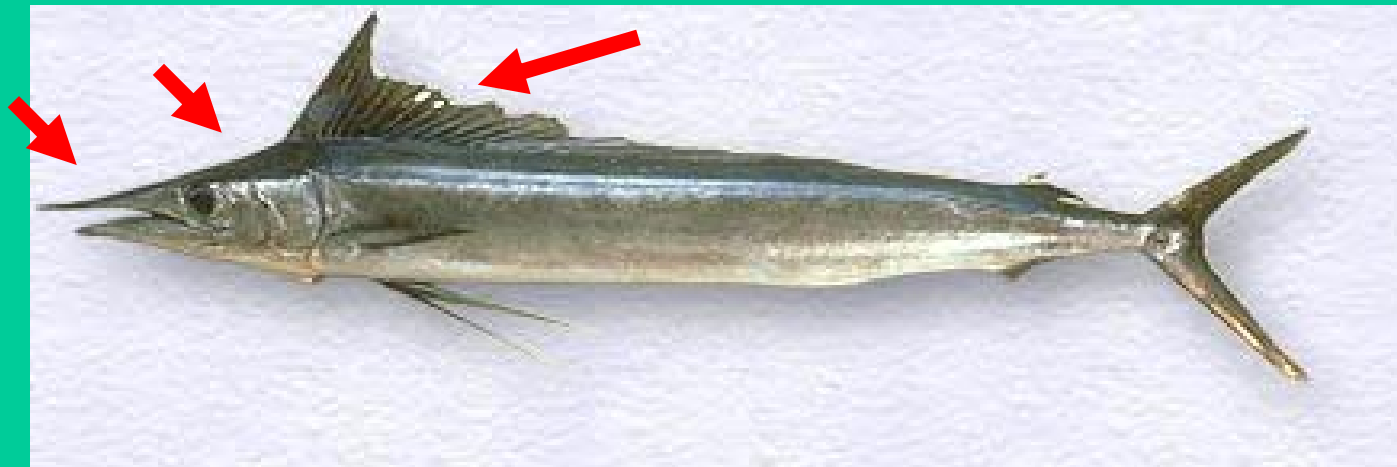
Photo: Bill Claborn, observer



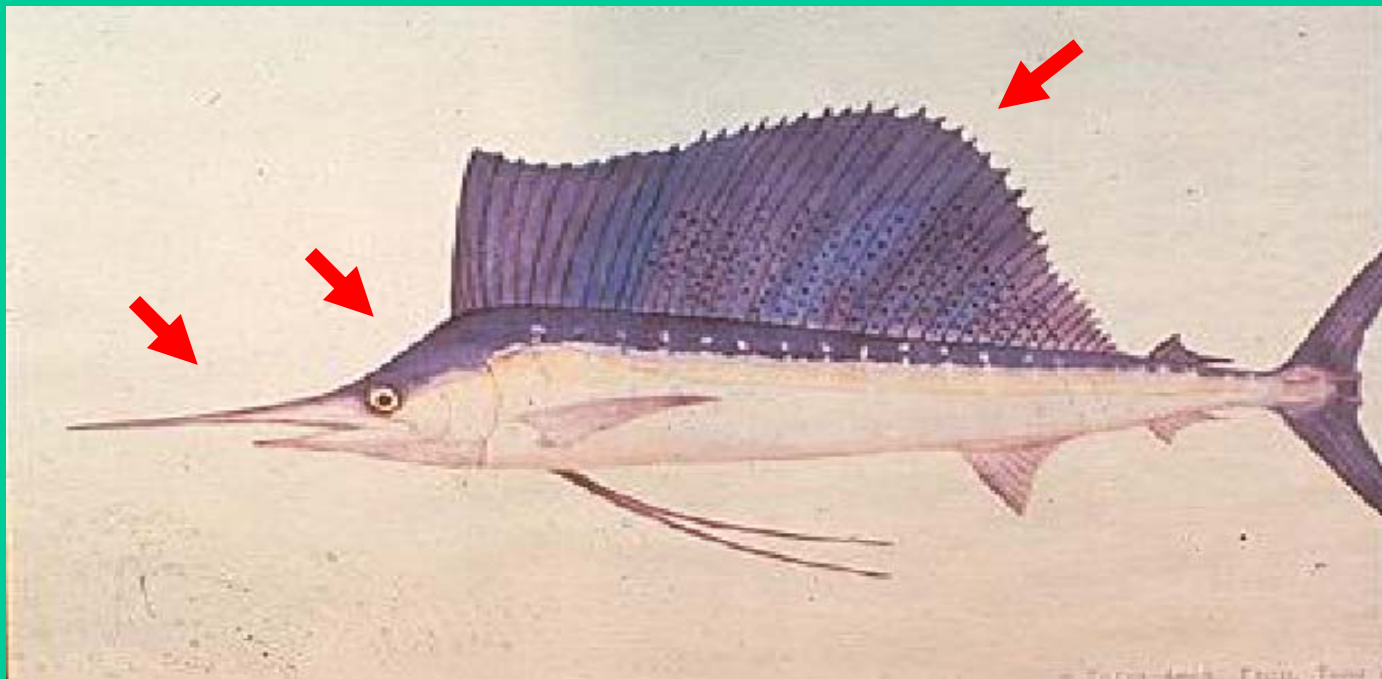
Photo courtesy of NMFS-PIRFS/CMEP

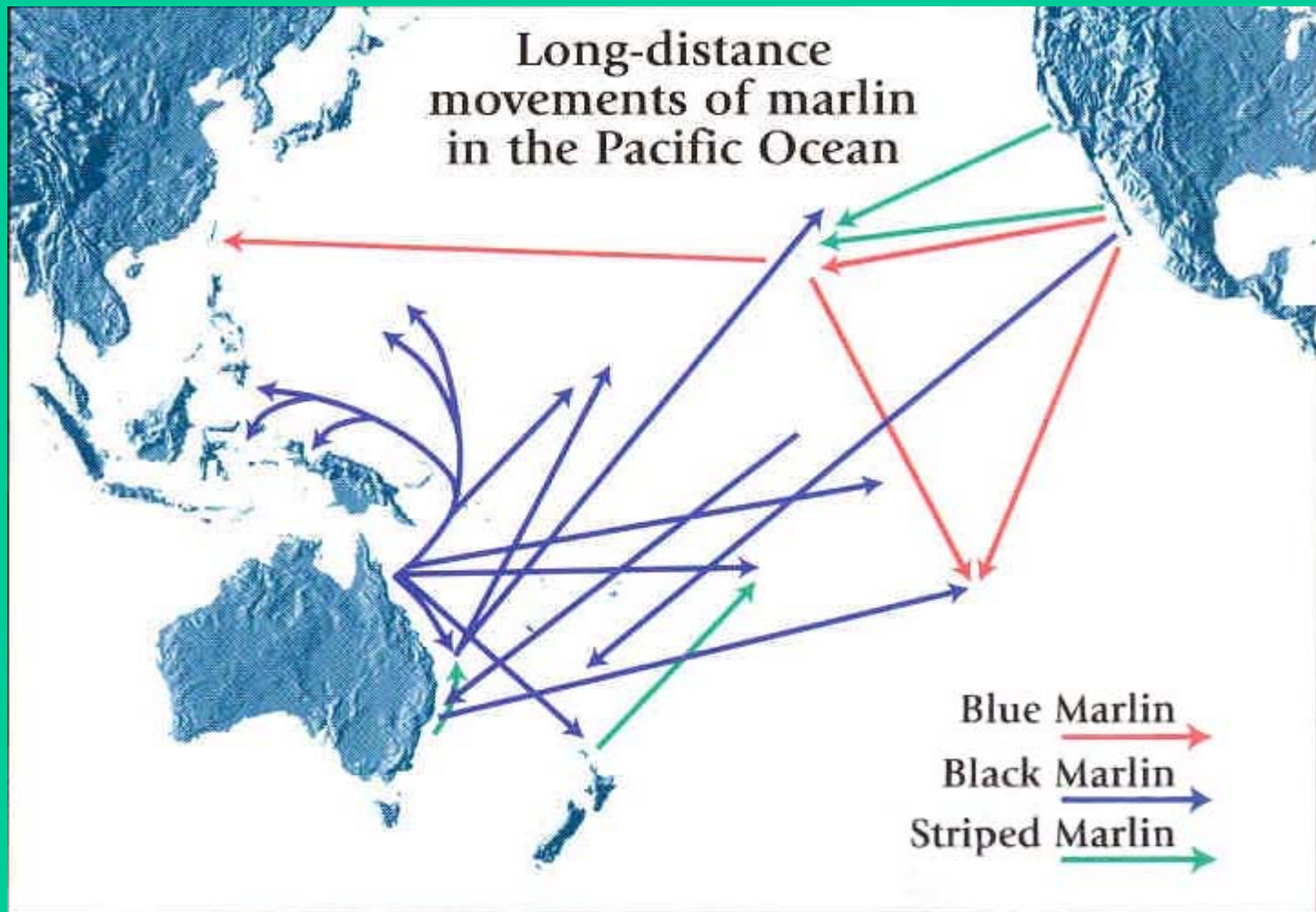
Sailfish





Shortbill Spearfish & Sailfish comparison

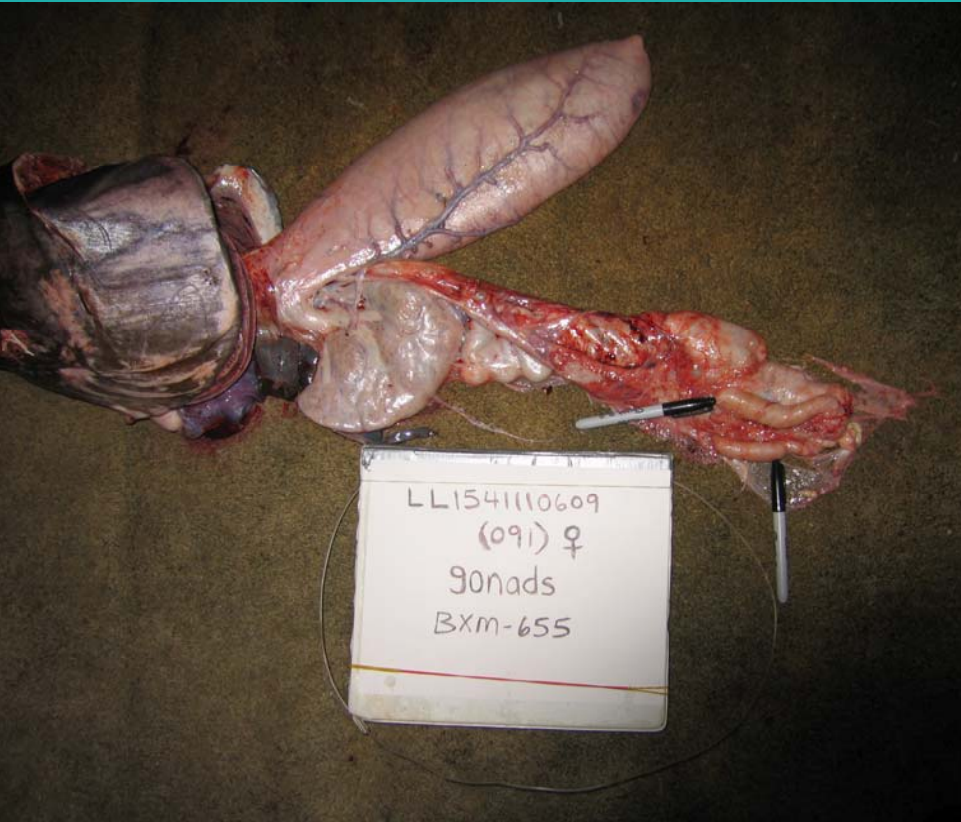




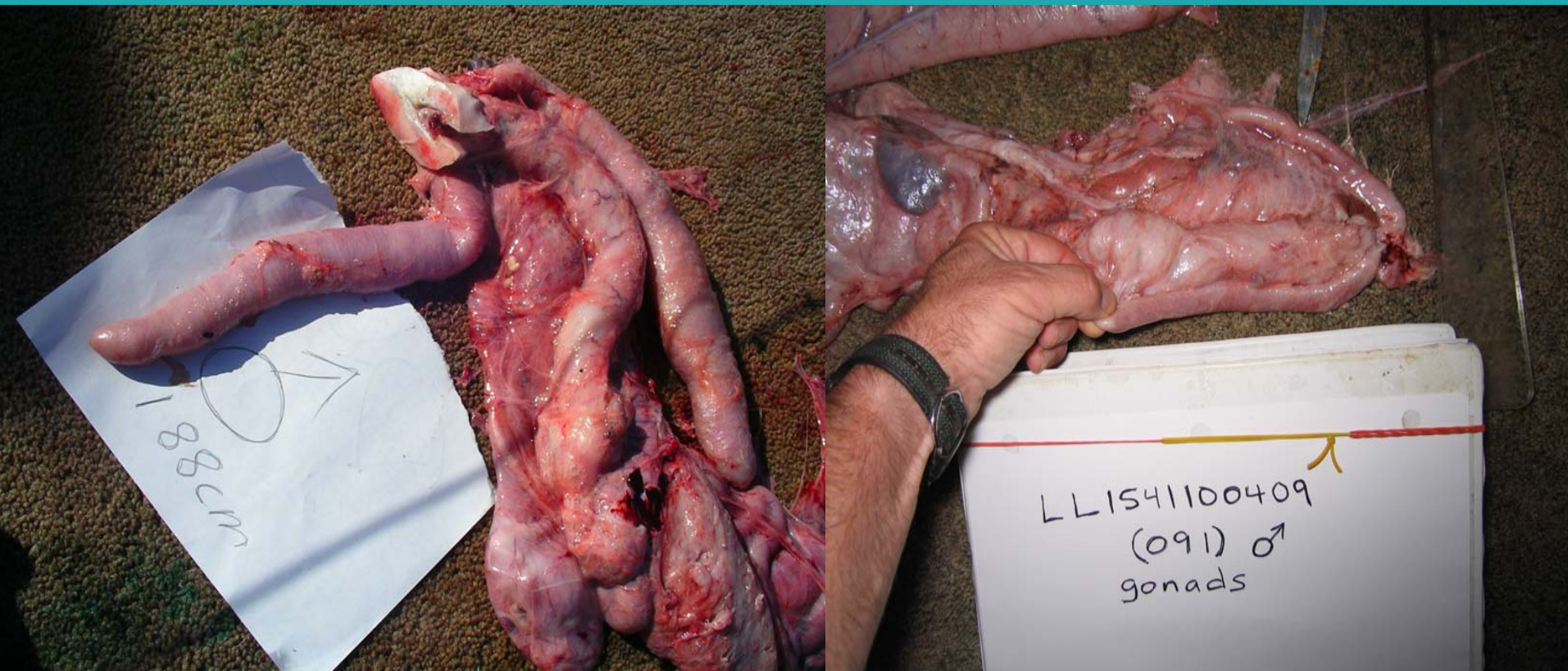
Guess where we are.

SEX

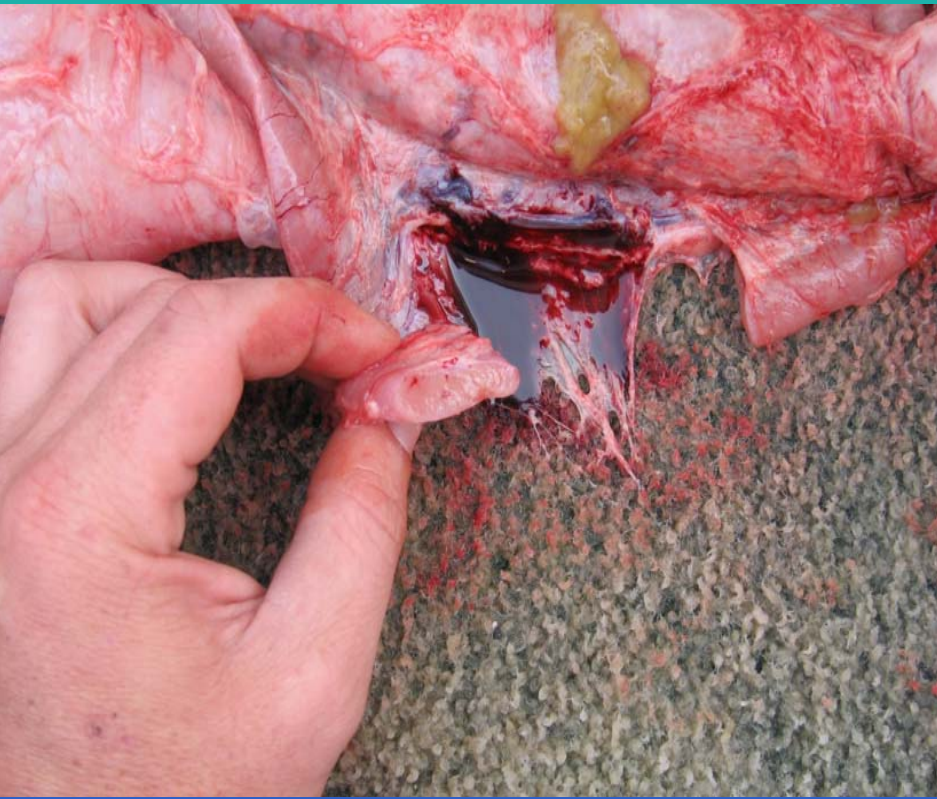
Swordfish Gonads



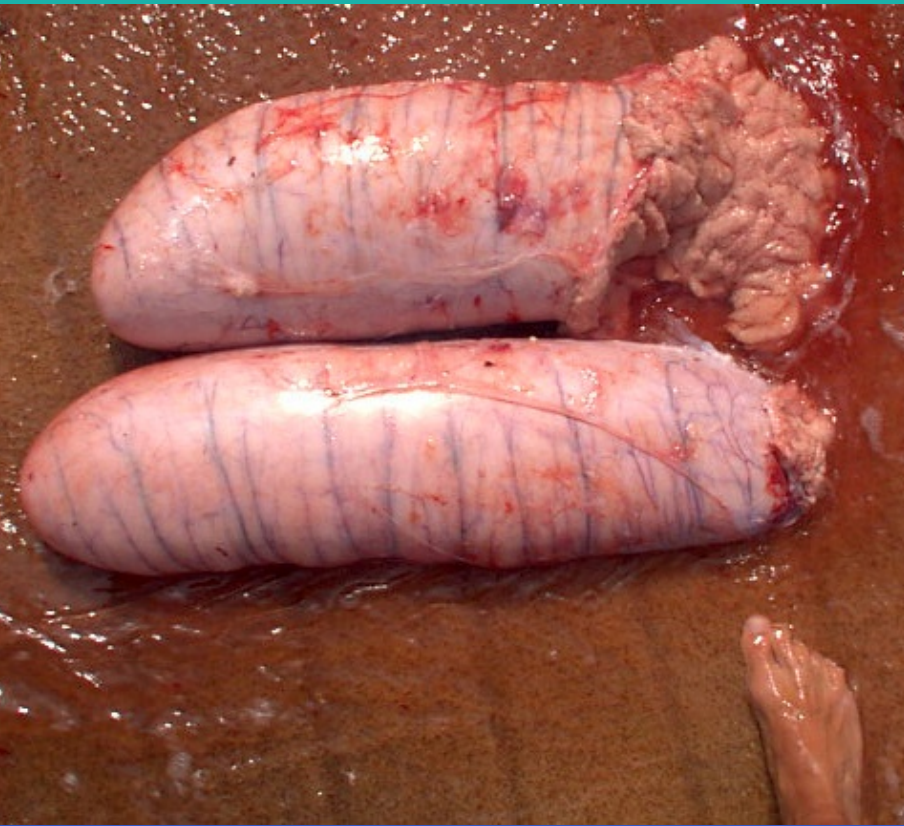
Fusiform paired organs on either side of intestine terminating at the anus



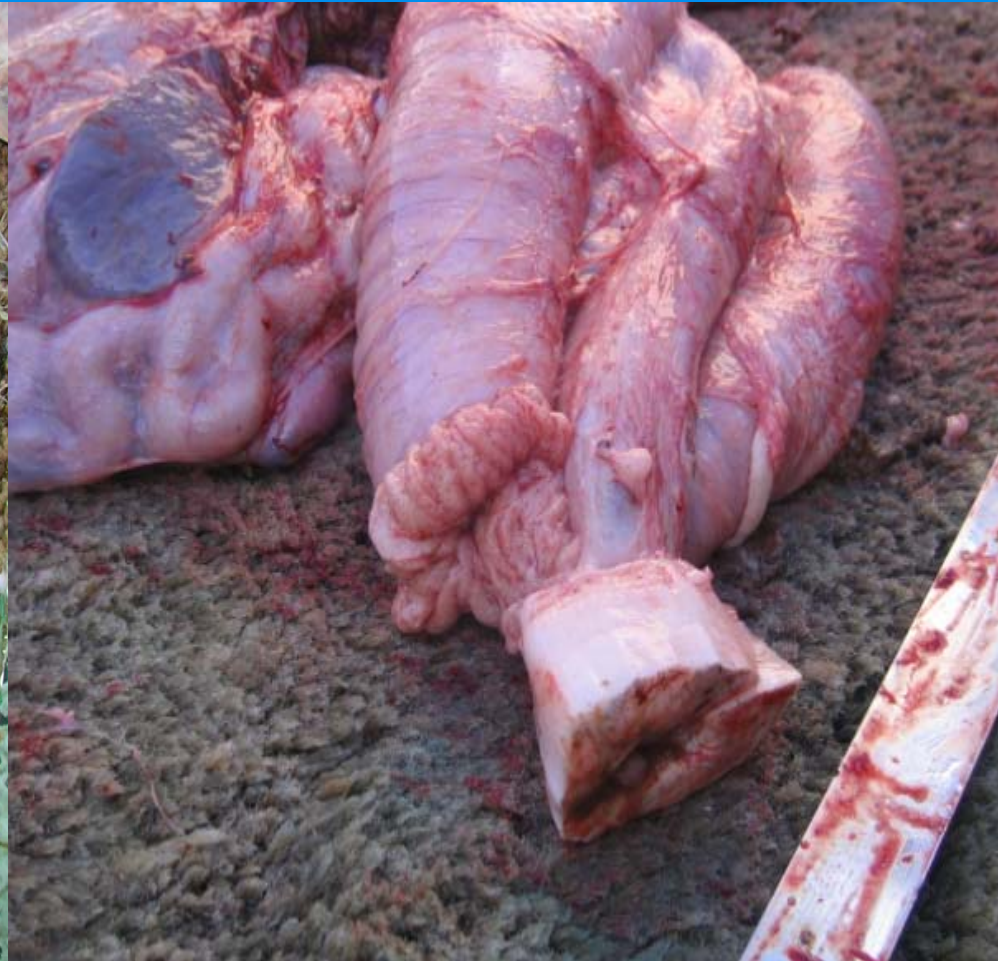
Male appear more flattened when not spawning. During spawning, testis become more round (like sausage) cross section shows milt.



Females sausage shape; cross section has hollow space in center of gonad.



Identify the differences



DEVELOPED BY PIRO OBSERVER PROGRAMS STAFF:

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RICH KUPFER, DEBRIEFER

